

**ABSTRACT OF THE DISCLOSURE**

The present disclosure pertains to a post-etch treatment which is performed after a dielectric etch process. Using the method of the invention, byproducts formed on the sidewalls of contact vias during the dielectric etch process can be removed efficiently. The method of the invention also reduces or eliminates the problem of polymer accumulation on process chamber surfaces. Typically, after the etch of a dielectric material to define pattern or interconnect filling spaces, a series of post-etch treatment steps is performed to remove residues remaining on the wafer after the dielectric etch process. According to the method of the present invention, a post-etch treatment method including one or more steps is performed after the dielectric etch process, preferably within the same processing chamber in which the dielectric etch process was performed. The post-etch treatment method comprises exposing a semiconductor structure to a plasma generated from a source gas comprising oxygen, a nitrogen-comprising gas, and a reactive gas comprising hydrogen, carbon, and fluorine. Two optional steps, a flushing step prior to the post-etch treatment and a cleaning step subsequent to the post-etch treatment, can be performed, respectively, before and after the post-etch treatment for the purpose of enhancing the fluorine and byproduct removal and post-etch chamber cleaning.